from: https://home-water-works.org/about/calculator

WATER USE CALCULATOR

Water Calculator

How much water do you use?

The Water Calculator estimates household water use, and compares your home to both a typical household and an efficient household in your zip/postal code. The calculator also estimates your carbon footprint from hot water consumption, and helps identify specific strategies for improving overall household water efficiency. Ready to save water and lower your water bills? The Water Calculator gets you started right away.

About the Water Calculator

homewaterworks CALCULATOR

How the Water Calculator Works

The Water Calculator takes information provided by the user and estimates indoor and outdoor water use with a series of mathematical models and equations developed by Aquacraft.

Initial Indoor Water Use Estimate

The initial few questions are used to identify the age of the house to determine which of three basic categories to place it in: "pre-1980 home", "standard home" or "efficient home".

Indoor water use for homes classified as "pre-1980" is initially estimated using this equation:

Indoor water use = 87.41 $y^{0.69}$ x 365

Where y = the number of residents in the home.

Indoor water use for homes classified as "1980-2010/standard home" is initially estimated using this equation:

Indoor water use = 67.251 $y^{0.6541}$ x 365

Where y = the number of residents in the home.

Indoor water use for homes classified as "post-2010/efficient home" is initially estimated using this equation:

Indoor water use = 59.58 $y^{0.53}$ x 365

Where y = the number of residents in the home.

Indoor uses are then estimated using the following table:

Pre-1980*	Standard Home*	Efficient Home*	Volume (gal/year)
25.5%	24.0%	14.7%	Toilet use
22.1%	16.0%	10.8%	Clothes washer use
17.4%	19.0%	31.2%	Shower use
15.1%	19.0%	16.5%	Faucet use
12.4%	14.0%	17.5%	Leak use
4.2%	3.8%	1.2%	Other use
1.8%	2.6%	6.5%	Bathtub use
1.4%	1.6%	1.7%	Dishwasher use

*DeOreo, W.B., Mayer, P.W., et. al. 2016. **Residential End Uses of Water, Version 2.** Water Research Foundation. Denver, Colorado.

Initial Outdoor Water Use Estimate

Outdoor use is estimated using two key factors: (1) the size/area of the landscape and (2) the water requirement for a standard turfgrass landscape.

The size/area is input by the user. The water requirement for a turfgrass landscape is estimated using the zip code provided by user and a look-up table that accesses climate data from:

Hearn, P. Jr. et. al. (2003) *Global GIS North America - A Digital Atlas of Planet Earth*. American Geological Institute, United States Geological Survey, ESRI.

Outdoor water use for each user is then calculated using this equation:

Outdoor water use = Area (SF) x Climate-based water requirement (inches) x 0.6233

where Area (SF) = Answer to Q5

where Climate-Based requirement = value from zip code ET lookup table

where 0.6233 = conversion factor 7.48 gallons/cubic foot / 12 inches per foot

Adjustments to Initial Water Use Estimates

As users answer questions located in the various rooms of the virtual house, end water uses are adjusted up or down based on the specific response. The calculator takes a number of factors into consideration and then develops its estimates, e.g. replacing toilets doesn't result in equivalent water use with a "water efficient home" in many instances. Changes are based on research results from Aquacraft end use studies and engineering estimates.

Hot Water Use

Hot water use is estimated using the following equation:

Annual Hot Water Use = Annual Indoor Use x 0.298

Carbon Footprint Calculator

The carbon footprint of hot water use is calculated (where applicable) using zip code lookup tables to identify inlet temperature and the local electric carbon generation constant.

If hot water is heated by gas, the following equation is used:

Carbon Footprint = ΔT x 0.0135 x 0.12 x Annual Hot Water Use

where ΔT = 140 - Inlet temp (value from zip code Inlet Temp lookup table)

If hot water is heated by electricity, the following equation is used:

Carbon Footprint = ΔT x 0.00272 x value from zip code electric constant table x Annual Hot Water Use

where ΔT = 140 - Inlet temp (value from zip code Inlet Temp lookup table)